Adult Health Exploration: Critical Care Case Studies

An Honors Thesis (NUR 430)

By

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Abstract

Critical care nursing is the most comprehensive type of nursing that there can be. It considers every body system, every assessment, every intervention, and it requires the nurse to be meticulous in order to analyze every finding that may indicate a complication or an improvement in the patient's status. This means that critical care case studies require the highest level of comprehension and nursing knowledge in order to consider the plan of care, the patient teaching, and critical thinking skills that I have been taught throughout my three years of nursing school. My countless hours studying pathophysiology in addition to my numerous hours spent in clinical have all allowed me to think outside the box and consider the different case studies the nursing students were provided with this semester. Due to the COVID-19 pandemic, we were provided with five different case studies to analyze and research more fully. The project objective was to explain the use of critical thinking in nursing as well as analyze and synthesize assessment data and other diagnostic evidence to form clinical judgments. From here we can use these objectives to determine how to make clinical decisions, reflect on the nursing care of multisystem critically ill patients, and explain what happened and what it means for my future nursing practice.

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I would also like to thank my previous nursing instructors who have taught me more than I could have imagined at my time here at Ball State.

Process Analysis Statement

Critical care case studies in the previous semesters have always revolved around a patient that you would have cared for in the hospital during a twelve-hour shift. However, due to the COVID-19 pandemic, we were not able to spend time with patients in the hospital. Therefore, we were given five different case studies that related to our course content. The case studies varied in format, but they consisted mainly of relevant information such as the reason they were admitted, the different assessment findings, and important lab and diagnostic results. From this information, we had to create a comprehensive case study.

The layout for the different case studies as well as the specific elements to cover were all laid out for the nursing students. Therefore, the format for each case study is identical. This means that the research and findings for each one was where I could greatly expand my knowledge and critical thinking skills. Each one required a different way of thinking and a different method of reaching the same ideal outcome- the full recovery of the patient. Analyzing the differences and similarities in assessments, treatment plans, and patient outcomes for the different case studies provided me with a comprehensive knowledge that a PowerPoint or a lecture could not give me. Diving deeper into not only the class content, but also all my previous knowledge about nursing care allowed me to connect the necessary components that make up critical care nursing.

One thing that I had to adapt to in order to complete these case studies was accepting the information I was given as the only information I knew. Typically, in the past when creating comprehensive papers about patient care, I was able to reflect on the intervention I personally completed or on how I viewed the patient's condition with my own eyes. I would pick up on more than I realized, and those things would often come out in my papers. However, with the

page or two of information we were given to create these critical care case studies, I had to accept that as all the information available to me. Oftentimes, I had to infer information, or I would write about what would be expected treatment or what would be expected findings for a patient in a similar clinical situation. These clarified the typical findings or the "textbook" findings, but it was important for me to realize that this is not how it will always be.

The process I would follow when completing the case studies was that I would typically read the whole case study first. I would then type out the patient history, the history of the current illness, and the assessment section. I would then go and listen to the MediaSite pertaining to the information on the case study. I would scroll through the PowerPoint, I would skim the textbook, and I would read through Mayo Clinic and the additional sources I thought were pertinent. I would then watch a video or two about the pathophysiology of the injury or illness. This would allow me to get a comprehensive knowledge about the related topic. I would then finish the case study in the format provided by the school of nursing. Finally, by the time I reached the analysis section of the paper I would be able to have some sort of feedback on the care provided. My instructors particularly paid attention to this section because it was the whole purpose of the comprehensive studies. We needed to not only be able to repeat the information and research the interventions, but we also needed to be able to assess them and critically think about them.

Comprehensive nursing knowledge is the expectation for senior level nursing students. Therefore, these ten case studies provided me with the opportunity to expand my nursing knowledge on new diseases and processes in addition to allowing myself to connect relevant assessments and interventions. Although the patient's prognosis may not have turned out optimally, it was important to assess the reasons for the alteration in patient status in addition to

alterations in care that could have changed the outcome. Critical thinking is not something that can be taught because it must be developed, but these ten case studies show my critical thinking development throughout not only this nursing class, but also my cumulative development through all my nursing education.

Acute Respiratory Distress Syndrome Case Study

Patient History:

This patient is a 17-year-old male who does not have any previously known medical history. The only known history is his current injury.

Course of Illness:

The reason for this patient's current status that is requiring emergent and critical care is due to a car crash that sent his car off a highway and into a nearby creek. His car was completely submerged and when he was pulled out, he was not breathing. CPR was given and he was awake by the time the paramedics arrived. However, he inhaled a significant amount of water and nearly drowned.

Physiology Summary:

The patient developed acute respiratory distress syndrome from the water inhaled. The water that was inhaled did not have to have a significant amount. It simply had to be enough to cause hypoxia from the inability of the alveoli to exchange oxygen and carbon dioxide. The hypoxia will eventually cascade all throughout the body, but in the lungs, it starts to alter the surfactant which leads to alveolar to collapse and closure of the airway and alveoli. This also leads to intrapulmonary shunting, ventilation-mismatch, and increased pulmonary vascular resistance. Ultimately this leads to ARDS which is fluid leaking from the small vessels attached to the alveoli. (“Drowning” 2019)

Another body system that ARDS affects is the heart. Because the body becomes so hypoxic and typically blood pressures become low, the heart must work extra hard. It often becomes difficult for the heart to work so hard for an extended amount of time. Over time, the

heart starts becoming hypoxic and may begin to stretch. After stretching, the cardiac output will decrease because the heart cannot pump as hard with the great volume entering the larger chamber. Also, the decreased blood pressure typically causes a decrease in preload which causes the heart to beat faster and pump harder for the muscle to get the appropriate amount of blood to the rest of the body. (Mayo Clinic, 2018)

Assessments:

Some assessment findings that were evident at the arrival to the ED included being severely anxious, and he had diminished breath sounds bilaterally with crackles and expiratory wheezes. He had minor bruises and abrasions with no additional traumatic injuries present. However, after twenty-four hours he became dyspneic, tachypneic, tachycardic, and he had progressive hypoxemia. His ABG numbers continued to decline even with interventions. After being ventilated, his oxygen level started to increase from the 77% it started at. Other assessment findings that would typically be found would include cold fingers and toes, low blood pressures, confusion, extreme tiredness, possibly decreased urine output, increased BUN with decreased GFR, increased heart rate, and hypoactive bowel sounds. (Mayo Clinic, 2018)

Diagnostics:

Methods to assess and diagnose the patient included ABGs, vital signs, post-intubation chest x-ray, and pulmonary artery catheter. The patient's initial ABG revealed a PH of 7.48 which is slightly basic for the blood. Also, his CO2 was low at 30 with his pO2 low at 60. This revealed respiratory alkalosis. The second ABG the patient had drawn revealed a greatly increased pH of 7.50 with a compensatory carbon dioxide level of 28 and a pO2 level of 48. Also, his oxygen saturation was 77. At this point the patient was intubated. A post-intubation

chest x-ray revealed an appropriate endotracheal tube placement with bilateral, diffuse, and patchy infiltrates. A pulmonary catheter was then inserted, and normal readings were determined, which was indicative of no cardiac complications thus far. Another ABG revealed a pH that returned to 7.48 and a PCO2 that slightly increased to 20 with a bicarb of 24. The pO2 raised to 58 and the oxygen saturation increased to 89%. After an increase of PEEP from 5 to 10 the patient's pH lowered to 7.46 with a carbon dioxide of 32 and a bicarb of 24. His pO2 increased to 65 and his oxygen saturation further increased to 90%. Lastly, the patient's PEEP was increased to 15 which increased his pCO2 to 33, it made his bicarb a normal value of 24, it made the pO2 a normal value of 88, and it increased his oxygen saturation to 95%.

Nutrition:

The nutrition that would be required for this intubated patient would be a high calorie, high protein, and low fat and low carbohydrate diet. The method of delivery for this patient would be either through an orogastric tube or through parenteral nutrition through a central line. It is also important to carefully manage fluids. Since the patient is not taking any fluids orally, all fluids necessary will need to go through a central or peripheral line. Intake and output should be closely monitored in order to prevent fluid buildup in the lungs but also prevent low fluids which will cause more strain on the heart and could possibly lead to shock of the other organ systems. (Krzak)

Nursing Diagnosis:

Nursing diagnosis for this patient would include impaired gas exchange related to ventilation-perfusion imbalance as evidenced by ABG levels indicating respiratory alkalosis in addition to dyspnea and tachypnea. This is related to acute respiratory syndrome. This syndrome

results in a leaking of the small blood vessels into the alveoli which causes a decrease in oxygen and carbon dioxide exchange. Another nursing diagnosis would be risk for acute confusion r/t hypoxia secondary to decreased cardiac output. As this has already been slightly exhibited in the patient, it is very likely to occur again. The patient went through severe hypoxemic periods and there may be signs of that for a couple days during recovery until he has his oxygen levels totally normal. He also had never been through anything like what he did, so he may just be disoriented and uninformed on what to expect. Lastly, a nursing diagnosis for this patient would be deficient knowledge r/t insufficient information AEB this being the first time the patient has had this occurrence and has been ventilated. This can create much anxiety for the patient, so in order to avoid this there are many steps that should be completed. ("Acute Respiratory Distress Syndrome Nursing Care Plan & Management," 2018)

Nursing Interventions:

Nursing interventions to supplement the impaired gas exchange would include suctioning when needed, constantly monitoring their blood oxygen levels and ABGs in order to assure improvements are occurring and talking with the physician about the ventilation settings. It is also possible to put the patient in a prone bed in order to increase gas exchange. You can give medications to dilate the pulmonary structures, you can give medications to replace surfactant, and you can give corticosteroids in the late stages of ARDS if necessary. ("Acute Respiratory Distress Syndrome Nursing Care Plan & Management," 2018)

Nursing interventions for acute confusion related to decreased cardiac output would include assessing level of consciousness and alertness. It would be important to continually maintain their oxygen levels to assure the brain is receiving appropriate oxygenation to prevent confusion. You could also place the patient in modified Trendelenburg to increase preload or you

could position them in a prone position. It also may be an option to continually sedate the patient for their work of breathing to be decreased and to maintain fluids to assure preload and afterload are adequate. (Ackley, Ladwig, & Makic, 2017)

Nursing interventions for deficient knowledge stems from the patient never being through anything similar to what he is going through right now. He is only 17 years old and he needs much education and guidance. He will need much education about the future complications of ARDS such as breathing problems, depression, problems with memory and thinking clearly, and fatigue (Mayo Clinic, 2018).

Drugs:

Medications this patient are most likely to be on would include a medication for bronchospasm, a medication for bronchial inflammation, and a medication for sedation (Mayo Clinic, 2018). A medication the patient would most likely be on for bronchospasm would be a beta 2 agonist such as albuterol. This medication promotes bronchodilation by acting on the beta 2 pulmonary receptors which relaxes smooth muscle. Major side effects of this medication would include tremors, dizziness, restlessness, and paradoxical bronchospasm. The next medication for bronchial inflammation would be a glucocorticoid such as Solu-Medrol. This drug decreases inflammation by the suppression of the migration of polymorphonuclear leukocytes and fibroblasts. It also reverses the increased capillary permeability. The major side effects of this medication include circulatory collapse, thrombocytopenia, GI hemorrhage, thrombophlebitis, and embolism. The final type of medication the patient would most likely be on for sedation while he is on the ventilator to decrease his anxiety and work of breathing would be propofol. This medication produces CNs depression by activating the GABA receptor. This medication is titrated in order to not prevent respiratory depression, but enough is given to keep the patient

sedated. Nurses often can give a bolus before turning the patient or providing some sort of intervention or if the patient is starting to wake up. Severe complication of this medication would include respiratory depression, increased intracranial pressure, seizures, asystole, pancreatitis, or propofol infusion syndrome (Skidmore-Roth, 2018).

IV Solutions:

Fluid management indicated for a patient with ARDS is primarily to maintain intravascular volume and perfusion to vital organs. However, it needs to be taken into consideration that there may be no gastrointestinal intake and that renal function may be impaired. Also, the heart muscle may have to work harder to get all tissues perfused, so fluids should be maintained. Because the goal of IV solution is for the intravascular space to be maintained, a lactated ringer or a normal saline solution should be given. The outcome of one of these solutions would be to increase the intravascular volume. If dehydration results, then the patient can be given a hypotonic solution to allow the movement into the intracellular space. However, the intravascular space should be corrected and maintained primarily. ("Fluid Management in Patients With ALI," 2006)

Medical Interventions:

Interventions the nurse can manage would include ventilation settings. It is important for the nurse to continuously monitor the oxygen levels in response to the ventilator settings. It is also important for the nurse to assess the patient for signs of labored breathing in an attempt to breathe against the ventilator. If this would occur, the patient should be further sedated. Especially in this patient's condition, the nurse should assess the changes in the patient's status

with the additional changes in PEEP. Since PEEP and positive airway pressure is necessary for patients with ARDS in order to keep the alveoli from collapsing, status should be improving with the increase in PEEP. If there are no changes, the physician should be notified, and additional interventions should be implemented. The nurse for this patient would also be the one continually monitoring the patient's OG tube with feedings in addition to staying on top of intake and output. Alterations should be noted by the nurse in order to discuss the changes or concerns with the physician.

Patient Safety and Quality:

Patient centered care was provided for this patient because he was continually being assessed with many different ABGs collected and with the pulmonary catheter inserted to give fluid status information and cardiac strain. He also had rapid response times to the different assessment and lab information received. Interdisciplinary teams were included due to the respiratory therapist being involved in addition to the physician being continually engaged in the critical situation in addition to the nurse being constantly at the bedside. Evidence-based practice was integrated through the interventions conducted. The use of PEEP is evidence-based practice and it may be one of the main interventions to improve the condition of the acute respiratory distress syndrome. In addition to the ventilator, maintaining hemostasis is shown through evidence-based practice to prevent further complications of the hypoxia.

Interpretation, Analysis, & Synthesis of Care:

As soon as the patient was received in the emergency room, it was known that he was going to go to intensive care because of the near-drowning incident. This is something I did not think would necessarily happen though. I thought it would depend on the patient's condition if

they should go to a step down or an intensive floor. However, the ED knew the complications that could arise from the near drowning incident. Therefore, when his condition progressed, no one was surprised, and he was already where he needed to be in order to receive the care he needed.

With the worsening of his symptoms such as shortness of breath and confusion, ABGs were continually drawn. These are what told the staff the patient was going to need to be intubated. The ABG following intubation was when he was diagnosed with ARDS. Here, the staff was able to care for him properly because they knew evidence-based practice that would help him recover. I suspect the staff knew this was going to happen before it did, so I reckon it was all just a matter of time before they placed him on ventilator support.

After his status was not only not improving but it was diminishing, the PEEP was increased. It seems to me that the increase in PEEP was the main reason for his improvement. I understand that it takes times for the surfactant to heal and for the alveoli to remain open, but it was necessary for the PEEP to allow the alveoli to stay open in order to decrease hypoxia which would then result in normal surfactant production that would keep the alveoli open on their own. Since it is visible the patient is progressing, the goal for this patient would be to eventually turn down the ventilator settings and wean him off. They would decrease his sedation and see how he would do breathing on his own. If all goes well and his ABGs remain normal, the patient will be on the road to recovery with minimal complications.

Status Asthmaticus Case Study

Patient History:

This patient's only known current medical history includes a history of moderate persistent asthma from childhood. He takes three medications daily which include Salmeterol, Fluticasone, and Albuterol. He also checks and maintains his peak expiratory flow (PEF) two times a day.

Course of Illness:

This patient presented to the emergency department with pronounced inspiratory and expiratory wheezes. This was after the patient's PEF was only 40% and he used his Albuterol inhaler four times in the last 12 hours. The patient in the ED was using accessory muscles, could hardly speak and had a blood oxygen level of 92.

Physiology Summary:

This patient with a history of asthma is in a state of status asthmaticus which is when the bronchial tubes become inflamed and hyperresponsive. This causes bronchospasm, a disruption in mucus production, and bronchial edema which ultimately leads to bronchoconstriction. The result is then hyperinflation of the lungs and increased work of breathing shown by exhaustion and the use of accessory muscles. However, this state is not responsive to traditional medical therapy and will oftentimes lead to acute respiratory failure. (Urden, Stacy, & Lough, 2018)

Another system that is often affected by this status is the heart. There is an increase in venous return to the right side of the heart because of the increased negative thoracic pressure during inspiration in the lungs. This increase in venous return to the right side of the heart forces it to work harder by pumping harder and faster. This can result in ventricular remodeling or it

can cause the septum to shift to the left which will decrease the space for the left ventricle to appropriately pump blood to the rest of the body. This ultimately leads to an increase in blood pressure and a decrease in cardiac output. All of these phenomena result in a decrease in systolic blood pressure with inspiration (which the patient presents with) which is called pulsus paradoxus. (Urden, Stacy, & Lough, 2018)

Assessments:

Upon admission to the ED the patient had inspiratory and expiratory wheezes through all lung fields in addition to using accessory muscles and he could not speak. His oxygen was 92%, his blood pressure on expiration was 112/80 and his blood pressure on inspiration was 100/76 showing he is in pulsus paradoxus as mentioned above. His heart rate was elevated at 124 and his respirations were elevated at 30. His ABG showed an elevated pH of 7.50, his pCO2 was decreased at 28, his bicarb was a normal level, and his blood oxygen was decreased at 65. This shows respiratory alkalosis because the carbon dioxide can get out, but the oxygen is not being exchanged properly. His PEF was 25 % of normal at this time. He was then given 4 liters per minute via nasal cannula and given multiple medications. However, twenty minutes later he became diaphoretic and more anxious and disoriented. His blood pressure on expiration was then 150/100 and on inspiration it was 135/100. His heart rate was 130 and his respirations were 36. His pH rapidly decreased to 7.30 and his other ABG levels revealed respiratory acidosis. He had diminished breath sounds and faint wheezing and he had 15 mm paradox blood pressure during inspiration and expiration. He was intubated and his peak airway pressures were high at 68 cm. A few hours later his peak airway pressure decreased to 42 with more wheezing. Twenty-four hours after admission he was evaluated for extubating with his oxygen remaining at 95% with

30% oxygen and his spontaneous minute ventilation was 8.2L. His spontaneous TV was 450 and NIF at -55. Lastly, his peak airway pressure was 30.

Diagnostics:

Diagnostic studies completed on this patient included vital signs which revealed higher blood pressures on expiration than on inspiration due to the patient's condition. This phenomenon is called pulsus paradoxus. This patient also had ABG levels drawn multiple times with the first one revealing respiratory alkalosis which meant there was much air trapping and bronchoconstriction requiring further medical attention such as more albuterol in addition to more Solu-Medrol. The second ABG revealed respiratory acidosis and a lower oxygen level which revealed now neither carbon dioxide nor oxygen were being exchanged in the alveoli. Also, both his expiration and inspiration blood pressures were much high with an elevation in pulse and respirations. Diagnostics to tell the patient's condition when he was intubated included assessing his peak airway pressure of initially 68 which required additional medications and maintaining the ventilation. His PAP decreased to 42 then and with more ventilation time eventually was reduced to 30 showing great progress in the patient's condition in only 24 hours.

Nutrition:

Recommended nutrition management for the patient when he is extubated would include a wholesome nutritious diet. It is important for patients to eat foods within each food group and eat small amounts of fats, oils, and sweets. Assuring the patient is eating fruits, vegetables, grains, proteins, and dairy groups is essential. Healthy foods can aid in a quicker recovery by strengthening and repairing the body by giving it vital nutrients (Tinkelman).

Nursing Diagnosis:

Due to the patient's status asthmaticus, the most vital nursing diagnosis to monitor and provide interventions would be impaired gas exchange related to alveolar hypoventilation as evidenced by ABG results. Assuring that gas is being exchanged in the lungs is essential for the patient's survival. Another important nursing diagnosis is decreased cardiac output related to decreased oxygenation as evidenced by ABG results and pulsus paradoxus. The final nursing diagnosis is deficient knowledge related to worsening of condition as evidenced by this being the first time the patient has been ventilated secondary to status asthmaticus. (Ackley, Ladwig, & Makic, 2017)

Nursing Interventions:

Interventions to improve gas exchange would include providing the patient with oxygen, sitting the patient up, giving Solu-Medrol and Albuterol, and ventilating the patient. Ways to increase the patient's cardiac output would be to give positive inotropic drugs, to assure the patient's intravascular volume is maintained, to properly position the patient, and to give ACE inhibitors to prevent ventricular remodeling. Interventions to improve the patient's knowledge about his current situation would be to educate the patient, to talk through interventions as they are completed, and to educate the patient on what to expect in the next couple days to reduce his anxiety overall. (Ackley, Ladwig, & Makic, 2017)

Drugs:

Medications this patient is on includes a medication for bronchospasm, a medication for bronchial inflammation, and a medication for sedation (Mayo Clinic, 2018). A medication the patient would most likely be on for bronchospasm would be a beta 2 agonist such as albuterol.

This medication promotes bronchodilation by acting on the beta 2 pulmonary receptors which relaxes smooth muscle. Major side effects of this medication would include tremors, dizziness, restlessness, and paradoxical bronchospasm. The next medication for bronchial inflammation would be a glucocorticoid such as Solu-Medrol. This drug decreases inflammation by the suppression of the migration of polymorphonuclear leukocytes and fibroblasts. It also reverses the increased capillary permeability. The major side effects of this medication include circulatory collapse, thrombocytopenia, GI hemorrhage, thrombophlebitis, and embolism. The final type of medication the patient would most likely be on for sedation while he is on the ventilator to decrease his anxiety and work of breathing would be propofol. This medication produces CNs depression by activating the GABA receptor. This medication is titrated in order to not prevent respiratory depression, but enough is given to keep the patient sedated. Nurses often can give a bolus before turning the patient or providing some sort of intervention or if the patient is starting to wake up. Severe complication of this medication would include respiratory depression, increased intracranial pressure, seizures, asystole, pancreatitis, or propofol infusion syndrome (Skidmore-Roth, 2018).

IV Solutions:

IV solutions are not a priority of care for a patient in status asthmaticus. Intake and output should be monitored to assure that there is not fluid overload or intravascular or intracellular dehydration. However, while the patient is on the vent, an isotonic solution should be given to maintain intravascular volume and perfusion to vital organs. It is important to not give too many fluids, so the heart muscle is not overworked. Because the goal of IV solution is for the intravascular space to be maintained, a lactated ringer or a normal saline solution should be given. The outcome of one of these solutions would be to increase the intravascular volume. If

dehydration results, then the patient can be given a hypotonic solution to allow the movement into the intracellular space. However, the intravascular space should be corrected and maintained primarily. (Urden, Stacy, & Lough, 2018)

Medical Interventions:

The nurse's main role in providing care for this patient is to continually assess the respiratory status and to assess the ABG levels in addition to the peak flow measures. The nurse should maintain the ventilator and assess when are appropriate times to suction the patient. The nurse should also decide if it is best to sit the head of the bed above thirty degrees and when to call the provider. Lastly, the nurse should continually monitor changes in patient condition and the nurse will need to be present when the respiratory therapist is attempting to wean the patient on the vent in order to determine if it is appropriate to extubate him.

Patient Safety and Quality:

Patient centered care was provided for this patient because he was continually being assessed as shown by multiple ABGs being collected and with continuous assessment of peak flow measurements. He also had rapid response times to the different assessment and lab information received. Interdisciplinary teams were included due to the respiratory therapist being involved in addition to the physician being continually engaged in the critical situation in addition to the nurse being constantly at the bedside. Evidence-based practice was integrated through the interventions conducted. The use of bronchodilators and ventilation is evidence-based practice in order for the patient's lungs to have a full recovery.

Interpretation, Analysis, & Synthesis of Care:

Starting with the patient in the ED, signs of status asthmaticus were evident. The patient was having an asthma attack, but typically asthma attacks respond to medications. This patient was not showing a response to any of the rescue medications he took which points towards status asthmaticus. The medications given to the patient in the beginning did not seem to help in any sort of way. His status deteriorated the more time passed. I would alter care here slightly and would have thought ventilation should have taken place sooner. I am unaware of all the qualifications the patient must have in order to be ventilated, but the patient's home medications did not work so I did not think the other bronchodilators at the hospital would be very effective either.

The patient's progression from severe respiratory alkalosis to respiratory alkalosis did not take much time to happen. Once this happened, it was clear to staff that there were no other interventions besides ventilation to aid in his status. His oxygen and carbon dioxide exchange in his alveolus was deteriorating quickly the longer the patient's lungs remained inflamed and spasming. Once the patient was intubated, he progressed relatively quickly. He even had a trial to be extubated within only twenty-four hours of his admission to the hospital.

The quick deterioration of the patient aided in a quick reaction to intubate the patient which then appeared to aid in the quick progression of the patient. I suspect he would be extubated within the next few hours as long as his status does not deteriorate. It is not expected for it to deteriorate because his peak flow has improved which means his bronchioles are less inflamed, his surfactant is returning to normal, and there is less spasming in the lungs. This patient should have a full recovery with only the need to educate the patient on steps to prevent this from happening again in addition to steps to take if it does appear to be occurring again.

Acute Tubular Necrosis Case Study

Patient History:

This patient does not have any known medical history besides the current illness.

Course of Illness:

This patient came into the ED due to six straight days of chest discomfort, paroxysmal nocturnal dyspnea, and orthopnea. He did not have any palpitations, but he did have diaphoresis with his chest discomfort. The episodes had continually gotten worse and he ended up coming to the hospital at one AM because of severe orthopnea and an inability to sleep.

Physiology Summary:

The physiology for this patient's kidney injury is most likely due to the accumulation of cellular debris that created an obstruction in the kidney. Once this happens, filtration will slow down and eventually stop. This creates pooling and further obstruction which leads to more ischemia and cell injury. The tubular epithelium, basement membrane, or the entire glomerulus are damaged at this point which prevents the production of urine, prevents the removal of wastes, and it prevents the normal balance of acid and bases, electrolytes, and water. (Urden, Stacy, & Lough, 2018)

The heart is also affected in this patient because it clinically appears, he had an episode of injury on the anterior wall of his heart. This is caused by a complete blockage of the left coronary artery which caused the ST elevation and the chest pain as the wall became ischemic and then injured from the lack of oxygen. This injury to the anterior tissue which consists of mostly the left ventricle, resulted in the patient's crackles in the lungs due to the muscle not

functioning properly, the patient's PVCs due to injured areas firing randomly, and the patient's ventricular tachycardia also due to the injured areas of the ventricles firing abnormally. ("Acute Kidney Failure," 2018)

Assessments:

This patient's first assessment included a physical exam where he was alert and oriented, his skin was cool and dry, and he was visibly short of breath with crackles halfway up on both lung fields bilaterally. The cardiac monitor revealed sinus tachycardia and S4, S1, S2, and S3 were heard with no murmurs. A foley collected 60 mL of dark amber urine and an ECG revealed ST elevation and Q waves leads V1, V2, V3, and V4. The patient's blood pressure was 126/80, his respirations were 32, his heart rate was 108, and his temperature was 99. His lab results were relatively normal except for his glucose level of 304, his ABG indicating slight respiratory alkalosis, and an elevated troponin level of one. After some time had passed, the patient began having 10-15 PVCs per minute and was anxious and restless at times. An ABG revealed pCO2 of 48 and a pO2 of 70 on an FIO2 of 1.00. His 6 am total urine output since admission was 860 at this point. A radial arterial line gathered an elevated CVP at 15, an increased PAWP of 29, and a decreased blood pressure at 100/70. Throughout the day, the patient's condition worsened with his urine output decreased and his PAWP remained high. After he was defibrillated three times, his systolic blood pressure was 94. On his third day his systolic blood pressure was 90 with his PAWP at 22 and his urine output still low. He had coarse crackles and rhonchi throughout his lungs. The patient's BUN was elevated to 58, his creatinine was elevated to 5.4, his sodium had decreased to 63, urine specific gravity was 1.008, and he had WBC, RBC, casts, and tubular epithelium cells in his urine. A CVVHD line was then placed with two liters of fluid removed

and his PAWP was 14. On day four at the hospital his FIO2 was 0.60 with adequate ABGs. He continued to have diffuse crackles and rhonchi and his cardiac output was 3.6, CI was 1.5, and his PAWP was 19. His urine output averaged 30 mL/hour. On day five his PAWP had increased to 26, his potassium had risen to 7.0, his creatinine was 6.2, his BUN was 70, and his calcium and magnesium were both decreased. CVVHD was continued for volume overload, azotemia, and hyperkalemia. On day 5 he developed ventricular tachycardia and advanced life support was initiated.

Diagnostics:

Diagnostics completed for this patient included vital signs, labs, an ECG, and a pulmonary arterial catheter. The first set of vital signs revealed an increased respiration rate and a slightly elevated temperature at 99. The ECG showed ST elevation in leads V1, V2, V3, and V4 which indicate anterior injury to the heart. ABG levels revealed slight respiratory alkalosis which indicates the patient is hyperventilating. His glucose is high with 304 which indicates the necessity for insulin and his troponin level was elevated to 1.0 indicating heart injury. Also, the patient's ABG indicated a low pO2 of 56 which resulted in the patient being placed on a nasal cannula. Another set of ABGs revealed an even lower oxygen level and a high carbon dioxide level with the patient on an FIO2 of 100%. The patient was then sedated and intubated due to these results. A pulmonary artery catheter gained results of an increased PAWP at 29 and a decreased blood pressure at 100/70 despite his Lasix administrations. Other diagnostics included an increase in temperature which resulted in the patient being given two different antibiotics. On the third day since admission, the patient's urine osmolarity was high at 372, his BUN was severely elevated at 58, his creatinine was elevated at 5.4, his specific gravity was elevated at

1.008, there was much present in his urine, and his urine was dark amber. All these diagnostics indicated the acute tubular necrosis which led to CVVHD being initiated. After the starting of dopamine, the patient's blood pressure was 102/59, his cardiac output was 3.6, his PAWP was 19, and his urine output was 30 mL/hour which indicated he still had increased preload in the left ventricle, but his urine output was improving. On day 5, the patient's PAWP had increased to 26, his potassium had risen to 7.0, his creatinine had risen to 6.2, his BUN was at 70, and his serum phosphorus was raised to 6.0. This resulted in the continuation of CVVHD. (Urden, Stacy, & Lough, 2018)

Nutrition:

While this patient is on the ventilator, he will be receiving either parenteral or enteral feedings. However, since he has acute tubular necrosis, his nutrition will be closely monitored by a nutritional therapist. He/she will analyze his labs and make up an enteral or parenteral feeding that will best aid in controlling the electrolytes and nutrients that the patient needs. (Malbran & Verburgh, 2020)

Nursing Diagnosis:

The first nursing diagnosis would be risk for electrolyte imbalance related to renal dysfunction. The second nursing diagnosis would be decreased cardiac output related to altered preload AEB decreased blood pressure and decreased CO & CI.

The final nursing diagnosis would be anxiety related to patient status AEB rapid change in patient condition. (Ackley, Ladwig, & Makic 2017)

Nursing Interventions:

Interventions for risk for electrolyte imbalance would be to live fluids, to obtain electrolyte levels, to be cautious giving Lasix, to adjust diet to electrolytes, and to put the patient on CVVHD. Interventions for decreased cardiac output would be to give the patient fluids, to give the patient dobutamine, to place the patient in modified Trendelenburg, to consider a pacemaker to maintain rhythm, to give lidocaine with PCVs, and to give norepinephrine. Interventions for anxiety would be to calmly explain interventions to the patient, to assess the patient's anxiety level, and to provide a calm environment with low stimulus. (Ackley, Ladwig, & Makic 2017)

Drugs:

The first medication given to this patient was regular insulin IVP which acts by decreasing blood glucose by transporting glucose into the cell. The major side effect is hypoglycemia for this medication. The next medication given was Lasix 40 mg which acts by inhibiting the reabsorption of sodium and chloride at proximal and distal tubules and in the loop of Henle. A side effect of this medication is hypokalemia, hypovolemia, and hyponatremia. The next medication given was lidocaine for his PVCs which acts by increasing electrical stimulation threshold of the ventricle which decreases automaticity. Side effects of this medication include hypotension, bradycardia, and respiratory depression. Next, the patient was sedated with Versed which depresses subcortical levels in the CNS and the major side effects are cardiac arrest, respiratory depression, and bronchospasm. He was then given dobutamine which causes increased contractility and increases cardiac output without increasing heart rate. Side effects include severe hypotension, hypovolemia, and heart failure. Next, because of the patient's 101

temperature, he was given tobramycin and cefotaxime which are antibiotics just in case he has a bacterial infection. Side effects include seizures, ototoxicity, and renal failure. After being coded, he was given Levophed which is a positive inotrope that increased heart contractility and increased cardiac output. Side effects include cerebral hemorrhage, necrosis, and anaphylaxis. The patient's tobramycin and cefotaxime were adjusted due to his rising creatinine and peak and trough levels were obtained. His dobutamine was also continually adjusted due to his blood pressure and the Levophed was eventually discontinued when the dose had been titrated down. (Skidmore-Roth, 2018)

IV Solutions:

This patient is not currently on any IV solution besides the IVPB listed above.

Medical Interventions:

Medical interventions provided by the nurse included drawing labs, continually monitoring the CVVHD, assessing for PVS, controlling the ventilator settings, and continually assessing the patient's vitals and physical assessment findings. It is essentially vital for the nurse to monitor the lab values while the patient is on CVVHD. Electrolytes, acids and bases, and hemodynamics must all be monitored and maintained for the best patient outcomes. (Urden, Stacy, & Lough, 2018)

Patient Safety and Quality:

Patient centered care was provided for this patient due to the quick decisions to act. The quick decision to intubate and then to start CVVHD may have made all the difference in the

patient's condition. Interprofessional teams were used with the respiratory therapist maintaining the ventilator settings, the nurse continually assessing the patient, the dietician providing enteral feedings for the patient, and the physician being present in the intubation and alterations in care. Evidence based practice was used for this patient because labs were used to assess patient condition and they were used to determine need for further CVVHD.

Interpretation, Analysis, & Synthesis of Care:

With the patient being admitted to the emergency room with chest discomfort and diaphoresis, the findings of the anterior wall injury were essential to predict possible complications from the alteration in wall function. The alterations in the left ventricle's ability to pump out blood to the body and properly profuse the organs may have been the result of the acute kidney injury. After discovering the alterations in the kidney function, it was then necessary to watch for electrolyte imbalances in addition to watching the acid/base balance and the hemodynamic status.

Some patient teaching that could be included in patient care would be education about all the different medications the patient was receiving. It is also important to assess the patient for pain and educate them on the importance of controlling their pain in order to promote rest and healing. Lastly, it will be important to educate the patient on the different plans of care and different interventions that will take place in the near future to help him reach a full recovery or as complete as is possible.

The expected prognosis of this patient is that he will continue receiving CVVHD until his kidney function has improved which will be shown by decreased BUN and creatinine and his urine output will return to normal with a normal serum osmolarity. For his cardiac status, I

expect he will be closely monitored with telemetry monitoring and regular EKGs. Also, his cardiac enzymes will be assessed to determine if there was any cardiac damage during his last code. Due to his multiple episodes of ventricular tachycardia, I expect that the patient will be on a medication such as amiodarone and they may consider inserting a pacemaker and a defibrillator. If this is done, then the device will shock the patient back into rhythm without delay and the need for human intervention. However, before this, much education and consideration should be given to the patient because of the lifestyle changes it will bring.

Chest Trauma Case Study

Patient History:

This patient has no known medical history except the current injury.

Course of Illness:

This patient came to the emergency department due to a motor vehicle accident. He sustains blunt chest trauma injuries from the steering wheel because there were no airbags in the vehicle. This patient was alert and oriented, but he had a sharp chest pain over the right side of his chest. He rated his pain at eight out of ten and he was short of breath.

Physiology Summary:

The injury to the lung caused by the force of the steering wheel against the chest caused air to leak out of the lungs and to accumulate into the pleural space. During inspiration, the air then pushes against the lung which decreases the expansion of the lung which decreases the lung's ability to oxygenate the blood. The affected side of the lung can collapse resulting in the alveoli becoming unventilated. Hypoxia can result which can lead to acute respiratory failure or acute liver failure. The flail chest from the multiple fractured ribs can also alter inspiration by allowing the lobe to expand out of the flail area. This will decrease oxygenation and functional alveoli. Lastly, the hemothorax will increase pressure in the thoracic cavity which will decrease the ability for the lungs to fully expand and oxygenate the blood. ("Pneumothorax," 2019)

The injury also caused the mediastinal to shift to the left. This shift to the left can result in cardiac alterations such as a decrease in room for the heart to fully fill during diastole. Also, the high pressures in the lungs can reduce the amount of blood that will return to the right

atrium. This lack of blood volume in the heart will result in the heart having to contract harder and faster for the heart to get the blood to the rest of the body in order to maintain oxygenation. (Urden, Stacy, & Lough, 2018)

Assessments:

This patient came into the ED with sharp chest pain and shortness of breath. His vitals included a blood pressure of 106/68, a heart rate of 116, and respirations of 28. Breath sounds were absent on the right lung and diminished on the left. The pulse oximeter measurement was 90% on four liters per minute via the nasal cannula. Also, heart sounds 1 and 2 were muffled. After a chest tube was inserted and set up to suction and a 50% venturi mask was placed, the patient's pulse oximeter showed 91%. Thirty minutes later, the patient complained of increasing shortness of breath with his pulse oximeter showing 88%. His ABGs showed a normal but low PH of 7.36, a high carbon dioxide of 46, a high bicarb of 29, a low oxygen of 58 and his pulse oxygen was now 86% with his heart rate at 132 and respirations at 36. The patient was then intubated and on mechanical ventilation. Thirty minutes later his respirations were 32, his heart rate was 130, his pH was high at 7.40, carbon dioxide normal at 40, bicarb normal at 26, but his oxygen low at 59. His oxygen saturation was 88% and he was struggling for air, so he was given a neuromuscular blocker. Thirty minutes later, his pH was 7.42, his carbon dioxide was normal at 36, his bicarb was slightly elevated at 27, his oxygen was still low at 70, but his oxygen saturation had risen to 92%. His chest tube had drained a total of 50 cc for the past hour and was still draining. He stayed on ventilation for the next 48 hours and his oxygen saturations ranged from 91 to 94%. Also, his chest tube drainage had slowed, and it was only draining 10 cc per eight hours.

Diagnostics:

Diagnostic tests completed for this patient included vital signs, ABGs, auscultating, and chest radiographs. The first set of auscultating and vital signs pointed to lung injury due to diminished breath sounds on the left side. The chest radiograph confirms this suspicion because it determines that there is a pneumothorax in the right upper to right middle lung, there is a tracheal shift to the left, there are 6 fractured ribs with four of them creating separate rib segments from multiple fractures. These findings indicate that the pneumothorax is a tension pneumothorax and that the air or drainage there must be drained because it is shifting the trachea from the built-up pressure. The second chest radiograph taken showed a moderate hemothorax on the right side and mediastinum almost at the midline and resolution of much of the pneumothorax. This indicated that another chest tube was needed to drain all the fluid present in the thoracic cavity. The first ABG drawn showed that the patient may be trending towards respiratory alkalosis. Once the patient was on the mechanical ventilator, his ABGs were more in the normal range except his oxygen level which was at 60. This means he was perfusing carbon dioxide, but oxygen was going into the alveoli as it should. His last set of ABGs was after his neuromuscular blocker. Here all his levels were back to normal except his oxygen. However, it had increased to 70. Since his oxygen level was improving relatively quickly, this just shows he needs more time on the ventilator for all the fluid and air to be removed from his thoracic cavity to allow his lungs to fully recover.

Nutrition:

The recommended diet for a patient with a pneumothorax would be a low carbohydrate diet. This is because carbohydrates release carbon dioxide which can alter the work of breathing.

Also, these patients should not be over or under fed because adequate nutrition is necessary for the body to completely heal. While the patient is on the ventilator, an orogastric tube will most likely be placed in order to properly deliver nutrients to the patient. A nutritionist would be consulted to determine the feedings necessary for the patient. ("Collapsed Lung (Pneumothorax)")

Nursing Diagnosis:

The first nursing diagnosis is impaired gas exchange related to decreased lung volume as evidenced by x-ray and shortness of breath. The second nursing diagnosis is decreased cardiac output related to decreased preload as evidenced by increased heart rate and decreased blood pressure. The third nursing diagnosis is risk for deficient knowledge related to new onset of illness and injury. (Ackley, B., Ladwig, G., & Makic, 2017)

Nursing Interventions:

Interventions related to impaired gas exchange would be to monitor the chest tube, to place the dependent lung down, to give the patient oxygen, suction the patient, and to provide neuromuscular blockers and sedatives to reduce the work of breathing. Interventions related to decreased cardiac output would be to give the patient lactated ringers, to set the patient in modified Trendelenburg, and to maintain ventilator settings to reduce high increased pressure in the lungs. Interventions related to deficient knowledge would be to assess level of patient understanding, assess best methods of learning for the patient, and to continually educate and reassure the patient on his condition and on the interventions being provided. (Ackley, Ladwig, & Makic, 2017)

Drugs:

This patient has a PCA setup with 2 milligrams per hour with the availability of one milligram every fifteen minutes as needed for pain. This medication acts by depressing the pain impulse transmission at the spinal cord level by interacting with opioid receptors. The major side effects include respiratory depression, orthostatic hypotension, constipation, and sedation. If the patient is not receiving relief from pain, then it would be possible to give a bolus dose or a dose for breakthrough pain. Another medication the patient received is Pavulon which is a neuromuscular blocker which means this medication relaxes the skeletal muscles. This was given for the ventilator to take over total ventilation. Some side effects include bronchospasm, decreased intraocular pressure, and hypertension. (Skidmore-Roth, 2018)

IV Solutions:

The only IV solution the patient is on is lactated ringer at 150 milliliters per hour. This solution is an isotonic solution, so the main purpose of this infusion would be to maintain the intravascular volume. This patient may have some bleeding that can replace that fluid in addition to the patient's decreased cardiac output related to the high blood pressure during inspiration in the lungs. This solution will help maintain the flow of blood not only through the lungs, but also to the heart and the rest of the body. (Urden, Stacy, & Lough, 2018)

Medical Interventions:

The nurse's role with medical interventions for this patient would be in positioning, gathering lab values, continually assessing the patient, maintaining ventilator settings, and

patient education. The patient's condition is rapidly changing, so the nurse needs to be on top of the assessments and interventions for the patient to have a full recovery.

Patient Safety and Quality:

Patient centered care was provided for this patient due to the quick decisions to act. The quick decision to intubate and then to give neuromuscular blockers may have made all the difference in the patient's condition. Interprofessional teams were used with the respiratory therapist maintaining the ventilator settings, the nurse continually assessing the patient, the dietician providing enteral feedings for the patient, and the physician being present in the intubation and alterations in care. Evidence based practice was used for this patient because labs were used to assess patient condition and they were used to determine when the patient needed to be intubated. Pain control and hemodynamic stability are also evidence-based practices used for this patient.

Interpretation, Analysis, & Synthesis of Care:

This patient was brought to the ED with numerous rib fractures and severe respiratory distress that required immediate attention in order to relieve the pressure in his chest cavity. The fractured ribs causing flail chest, the pneumothorax, and the hemothorax all were causing alterations in respiration which greatly reduced the patient's blood oxygen levels. Although neither acidosis nor alkalosis truly resulted, the oxygen levels were enough to cause concern.

The decision to intubate the patient was a vital one because it may not have been possible for the patient's lungs to completely expand and heal with the patient struggling for breath. Also, the neuromuscular blocker allowed the ventilator to completely take over with PEEP keeping the

alveoli open longer in addition to an adequate tidal volume being maintained which over time increased the patient's blood oxygen levels. Once the oxygen levels are adequate and the fluid and air are drained from the pleural cavity and the patient's ribs begin to heal, the patient should continue to progress. However, in order to get there, there were multiple diagnostic tests necessary in addition to complete and thorough assessments of the patient.

There are not many alterations in care that would be necessary because steps were taken in a very timely manner. The patient was showing signs of progression in a relatively short period of time. I suppose weaning protocol could have been completed in those 48 hours the patient was kept on the vent and good oral care should have been provided. I also think an orogastric tube should have been placed and the patient should be positioned on his left side. Physical therapy should be included in the care provided in order to maintain the patient's neuromuscular status. Overall, this patient is receiving interdisciplinary care in order to reach a full recovery. With his oxygenation adequate and his other systems routinely monitored, it is expected that the patient will be extubated soon with minimal complications.

Subdural Hematoma Case Study

Patient History:

There is no known history besides the current injury.

Course of Illness:

This patient came to the emergency department due to falling off a second-floor balcony 10 feet up and directly landing on his head. The floor he landed on was cement. He immediately lost consciousness and the paramedics brought him in with 4 mm pupils that were briskly reactive. His Glasgow Coma Scale (GCS) score showed eye opening to painful stimuli, incomprehensible sounds, and withdrawal to painful stimuli with all four extremities.

Physiology Summary:

The diagnosis of a stellate occipital skull fracture occurs when the lines of break in the skull radiate from a point. This point is usually the site of the injury, which would be the location the patient landed on his head. Since the skull fracture occurred in the occipital part of the skull, it is most likely the patient landed on the back part of his head. The most serious complications of this type of injury includes infection and possible brain damage. (Urden, Stacy, & Lough, 2018)

The patient's diagnosis of a subdural hematoma explains the decreased GCS in addition to the altered pupil reactions. A subdural hematoma occurs when blood accumulates between the dura and the arachnoid membrane. This causes a rupture of bridging veins that connect the two layers. The bleeding also can put pressure on the brain tissue and can lead to gradual loss of consciousness and possibly death if not treated. This can be caused by acceleration-deceleration, rotational, cerebral contusions, or intracerebral hemorrhage. ("Intracranial Hematoma" 2018)

Assessments:

The initial assessment completed for this patient includes the initial GCS score that showed eye opening to painful stimuli, incomprehensible sounds, and withdrawal to painful stimuli with all four extremities. His pupils were 4 mm and briskly reactive. The second GCS showed eye opening to painful stimuli, incomprehensible sounds, and localizing pain. At the ED, his VS included a BP of 110/72, a HR of 65, RR of 18, and a temperature of 37. GCS was now 11 with eye opening to verbal stimuli, inappropriate words, and localizing equally and bilaterally to painful stimuli. Pupils were equal, brisk, round, and reactive to light. He had negative raccoon eyes, negative Battle's sign, and negative hemotympanum. He had right temporal scalp swelling and swelling around the occiput. His heart was in normal sinus rhythm without ectopy at a rate of 65 and he had normal cardiovascular assessment findings. He was placed on a 40% face mask with unlabored, regular, symmetrical breaths. His abdomen was soft, nontender, and he had normoactive bowel sounds. A foley gathered 250 mL of clear, yellow urine and he had scattered abrasions on his hands, arms, and legs. Also, the chest x-ray showed no cervical or lumbar fractures. The skull x-ray showed a stellate occipital skull fracture. A CT revealed moderate generalized cerebral edema. An ABG showed a high pH of 7.50 and a low pCO2 of 28. The other labs were within range except for a slightly low hemoglobin at 12 and a hematocrit at 30%. Over the next 12 hours, the patient became more difficult to arouse, his GCS deteriorated to E2, V1, and M4, and his right pupil was sluggishly reactive at 4 mm. A CT scan showed a right subdural hematoma. After evacuation of the hematoma, his BP was 100/60, his heart rate was 78, his respirations were 13, his temperature was 37.8, his intracranial pressure was 20, and his cerebral perfusion pressure was decreased at 53. His ABGs were close to normal range as well as his other labs. The next three days his ICP remained elevated. However, by postoperative day 8,

his ICP became stable and below 20 mm Hg. He had an order to wean, but his pCO2 reached 42 and his ICP began to elevate to above 20. The weaning was stopped until the next day when he was successfully weaning off the ventilator. Postoperative day 14 his GCS showed spontaneous eye opening, inappropriate conversation, and localizing movement of all four extremities. His vital signs were stable, and he was able to be transferred.

Diagnostics:

Diagnostics completed for this patient includes initial vital signs which were all normal findings. His head to toe assessment revealed some sort of neurologic injury, but it cannot be confirmed what exactly it was until further testing. The first X-ray showed stellate occipital skull fracture. Treatment for this injury depends on the severity of the skull fracture. However, many do not require additional treatment besides bandages and cleaning regularly because infection is the biggest concern. A follow up CT scan revealed moderate generalized cerebral edema. The patient's labs later that day showed slight alkalosis and his hemoglobin and hematocrit were slightly low. This is cause for concern regarding possible hemorrhage or internal bleeding. Later after his right pupils became sluggish and the patient was more difficult to arouse, they completed another CT scan. This CT showed right subdural hematoma that required evacuation immediately. During the procedure, an ICP, an arterial line, and a CVP catheter were placed to closely monitor the patient. Labs were improving, but his ICP remained high over the next few days. This means that he should be given more mannitol and kept on the ventilator until the pressure goes down. After a few trials to wean him off the ventilator he was finally weaned and his ICP was down as well as his pCO2. His neurological exam was improving, and his vital signs were stable. (Urden, Stacy, & Lough, 2018)

Nutrition:

Proper nutrition after a brain injury is essential to recovery. Some studies have shown that a Mediterranean diet rich in fruits, vegetables, whole grains, beans, nuts, olive oil, and fish may be the most beneficial. ("Diet After Brain Injury: Healthy body, Healthy Mind") However, while the patient is on the ventilator, he will be receiving enteral nutrition most likely through an orogastric tube. The dietitian will be working with the patient to keep his salt levels down, to limit the intake of fatty substances, and balancing dietary supplements as needed. (Urden, Stacy, & Lough, 2018)

Nursing Diagnosis:

Nursing diagnosis for this patient would include impaired gas exchange related to alteration in neurological function as evidenced by pCO2 and the need for ventilation. Another nursing diagnosis would be decreased intracranial adaptive capacity related to cerebrovascular impairment as evidenced by increased intracranial pressure and decreased cerebral perfusion pressure. The last nursing diagnosis would be risk for anxiety related to alteration in patient condition. (Ackley, Ladwig, & Makic, 2017)

Nursing Interventions:

Interventions related to impaired gas exchange would be to provide the patient with oxygen support, to continue to monitor the carbon dioxide levels in the blood, to alter the ventilator settings to compensate for the carbon dioxide, and to sit the patient up to provide optimum oxygenation. Interventions related to decreased intracranial adaptive capacity would be to continually monitor the patient's intracranial pressure, to monitor for signs the increased

pressure is affecting the patient, and to reduce the stimuli by controlling the environment. Lastly, interventions related to risk for anxiety would be to continually explain interventions to the patient even if he may not be able to hear them, reduce environmental stimuli to promote rest, and to cluster care so as to not overwhelm the patient. (Ackley, Ladwig, & Makic, 2017)

Drugs:

This patient was on morphine for pain which decreases pain impulse transmission at the spinal cord level by interacting with opioid receptors. Side effects of this medication include respiratory depression, constipation, sedation, and orthostatic hypotension. This patient is also on mannitol to decrease fluid buildup in his brain from inflammation. This medication acts by increasing osmolarity of glomerular filtrate which will inhibit the reabsorption of water and electrolytes and therefore increases urinary output. Major side effects for the medication include seizures rebound increased intracranial pressure, and circulatory overload. This patient is also on Pavulon which is a neuromuscular blocker. This drug acts by inhibiting the transmission of nerve impulses. It does this by binding with cholinergic receptor sites. Side effects of this medication include bronchospasm, cyanosis, and respiratory depression. (Skidmore-Roth, 2018)

IV Solutions:

This patient is receiving lactated ringers after his surgery mainly to replace intravascular volume that could have been lost during the procedure. Lactated ringers are isotonic solutions, so they stay inside the blood vessel. It does not alter intracellular or extracellular volumes and it does not promote great fluid shifts in the patient. (Urden, Stacy, & Lough, 2018)

Medical Interventions:

Medical interventions the nurse would complete for this patient would include detailed and thorough continuous assessment of not only the patient's physical status, but also his neurological status. The nurse would need to assess vital signs, labs, ventilator settings, arterial line assessments, the CVP catheter, the ventriculostomy, and the foley catheter.

Patient Safety and Quality:

Patient centered care was provided for this patient due to the rapid diagnosis. The quick decision to do an additional CT scan and take the patient to surgery may have made all the difference in the patient's condition. Interprofessional teams were used with the nurse continually assessing the patient, the OR team evacuating the hematoma, the dietician providing enteral feedings for the patient, and the physician being present in the alterations in care. Evidence based practice was used for this patient because labs were used to assess patient condition, the ventilator was used to control the patient's breathing, and a diuretic was used to decrease intracranial pressure.

Interpretation, Analysis, & Synthesis of Care:

Things that this patient could be taught about are primarily what interventions you are doing while they are being completed. You also should explain the plan of care, so the patient has some sort of timeline. Although it does not seem like the patient can hear you, it is very possible that he can. He had neuromuscular blockers, so if he was awake, then you would not be able to tell. It is essential to talk to the patient and ease his anxiety about the current situation. It is also important to assess his pain level with a nonverbal scale in order to stay on top of his pain.

The expected outcome of this patient is that he will continue to recover at the rehabilitation center. It is most likely that he will not have any complications, but it is possible that he could have some vision issues due to the damage to his occipital lobe. It is also possible that he could get an infection from the skull fracture or he could have frequent headaches from the brain injury. This patient will have to complete some physical therapy in order to get his body moving and functioning properly again after 14 days of sitting in a hospital bed.

I think the care for this patient was adequate, but I would have thought a CT scan sooner could have been more beneficial for the patient. I also think proving the patient will have an orogastric tube to provide proper nutrition sooner could have been beneficial. I also think physical therapy would be beneficial to ensure the patient stays active and does not lose muscle tone. I agree that it was essential to keep the patient ventilated, but I feel as though there could have been other interventions that could have taken place to try and bring down the patient's ICP instead of keeping him on the ventilator for so long. Keeping him ventilated increases the recovery time of the patient and it increases the risk the patient will get a ventilator associated infection.

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